

Secondary Articulation Agreement

Part A (To be completed by Secondary CTE Instructor or Administrator.)

District / High School / Career Center	Oakland Schools Technical Campus – NW, SE		
Secondary Program Title:	Lineworker Electrical	CIP Code:	46.0303
Name and Title of Secondary Contact:	Ben Morin, Career Focused Education Consultant, Articulation		
Mailing Address:	1371 N Perry St	Pontiac	MI 48340
	Street & Office Number	City	State & Zip
Office Phone:	248	209	Email: Benjamin.morin@oakland.k12.mi.us
	Area Code	Number	

Part B (To be completed by HFC Instructor, Dean, Associate Dean or Administrator.)

HFC Program Title:	Power and Trades Pathways Core/BLDE 100 Energy Industry Fundamentals	CIP Code:	47.0000
Date of Agreement:	09/01/2021		
Agreement Period:	1 Year		
*Expiration Date:	09/01/2022		

*For the purposes of students enrolling and receiving articulated credit, this agreement remains effective for three (3) additional years after the expiration date. This will allow students who completed the secondary program during the agreement period to finalize the agreed upon requirements and receive articulated credit.

Purpose: The purpose of this agreement is to facilitate the transition of students from the above-named high school Career and Technical Education program to the aligned Associate Degree Program or Career and Technical Education Program at Henry Ford College (HFC). Academic credit is awarded for course requirements of the HFC certificate or degree program based on the completion of equivalent courses in the above named program at the recognized secondary institution.

General Terms and Conditions: An articulation agreement established with the College shall not exceed three years in duration. Students requesting articulated credit shall satisfy the conditions and requirements as stated in this agreement within three (3) years after their termination of student status at the secondary institution. Any request received after that period shall be subject to approval by the appropriate HFC instructor and dean. Credit will be awarded as specified under the “Program Specific Terms, Conditions, and Requirements” of this agreement. Students shall be responsible for initiating the process to receive articulated credit as specified by this agreement by submitting a completed “Student Application for Articulated Credit” form. Credit granted beyond HFC is at the sole discretion of the transferring institution accepting credit.

Revisions and Renewals: This agreement shall be reviewed annually by both parties or at such time that substantive program changes occur within the HFC or the secondary program. Revisions

and renewals must be in writing and agreed to by both parties before any modifications are made to this agreement. **Contact: Brandon Nowak, Articulation Agreement Manager** bnowak1@hfcc.edu

Secondary Articulation Agreement Program Specific Terms, Conditions, and Requirements

Part C (To be completed by HFC Instructor, Dean, Associate Dean or Administrator.)

HFC Program Title: Power and Trades Pathways Core Certificate Program **CIP Code:** 47.0000

(The space below is used by HFC instructors, Faculty Chair or Administrators to specify secondary articulation agreement terms, conditions, and requirements for the above program.)

1. Students must achieve a "C" or better average for each applicable class taken at Oakland Schools that may apply to the specified program at Oakland Schools.
2. Students must have demonstrated a good/satisfactory attendance record for the course/program at Oakland Schools.
3. Students from Oakland Schools must demonstrate competency in each course, for which HFC will grant articulated credit, as determined by HFC Faculty.
4. The secondary articulation agreement is predicated on relevant course/program curriculum submitted by Oakland Schools and reviewed/evaluated by HFC Staff.
5. Secondary articulated credit will be held in escrow for:
BLDE 100 Energy Industry Fundamentals 4 CR
6. To receive escrowed articulated credit, students must pass the Center for Energy Workforce Development (CEWD) Energy Industry Fundamentals Exam with a 68% or better.

Secondary Instructor or Administrator Name and Title:

Ben Morin

Printed Name

OS Career Readiness Consultant

Printed Title

Authorizing Signatures:



Secondary Instructor or Administrator

9/14/2021

Date



HFC Instructor or Faculty Chair

09/14/2021

Date

Energy Industry Fundamentals Certificate Program

The course content focuses on understanding various types of energy and their conversion to useable energy such as electrical power. How generated electrical power is transmitted and distributed to the point of use.

01.0 Demonstrate knowledge of the basic and emerging principles and concepts that impact the energy industry-- the student will be able to:

- 01.01 Explain the flow of energy from generation through distribution to the customer.
- 01.02 Discuss the history of the United States energy industry/infrastructure (refer to Energy Information Administration www.eia.doe.gov).
- 01.03 Identify the role and function of generation, transmission and distribution organizations.
- 01.04 Explains the role of regulatory bodies in the energy industry (Federal Energy Regulatory Commission www.ferc.gov ; Public Service Commission of the State of Florida www.psc.state.fl.us) (highlight "obligation to serve").
- 01.05 Discuss environmental laws and regulations that impact the energy industry (local, state, and federal) and explain importance of proper documentation to ensure compliance.
- 01.06 Explain the different structures of energy companies, including investor-owned utilities, municipalities (and associated utility practices such as water/wastewater), electric cooperatives, independent power producers and can explain the different lines of energy business, including electric and gas.
- 01.07 Describe the process of electric metering and billing for energy consumption.
- 01.08 Discuss the importance and role of unions in the industry.

02.0 Apply compliance with procedures necessary to ensure a safe and healthy work environment-- the student will be able to:

- 02.01 Review the role of the U.S. Department of Labor/ Occupational Safety and Health Administration in work place safety.
(<http://www.complianceregs.com/29cfr/1910/subR/1910-269.html>)
- 02.02 Identify both potential hazards and accident scenarios in the work environment.
- 02.03 Follow established safety procedures (OSHA regulations and utility company procedures).
- 02.04 Evaluate changes in the environment with respect to their impact on safety of self and others.
- 02.05 Promote effective local, state, and national security operations for the protection of people, data, property and institutions.
- 02.06 Comply with energy industry safety procedures and proper ways to perform work.
- 02.07 Name potential threats created by deviation from safety procedures and improper use of tools and equipment.
- 02.08 Use safety equipment as specified by user manuals and safety training.

- 02.09 Use Personal Protective Equipment (PPE) including safety glasses, hearing protection, gloves, work boots, and hard hats.
- 02.10 Keep personal safety equipment in good working order.
- 02.11 Use tools and equipment in compliance with user manuals and training.
- 02.12 Call attention to potential and actual hazardous conditions as they arise.
- 02.13 Alert coworkers and supervisory personnel to hazardous conditions and deviations from safety procedures in a timely manner.
- 02.14 Maintain appropriate certification and is knowledgeable in first aid or first response procedures.
- 02.15 Demonstrate understanding and knowledge of lock/tag out practices in the work place.
- 02.16 Notify person in charge and/or coworkers of unsafe work conditions.
- 02.17 Stop the job if there are unsafe working conditions.

03.0 Understand electric power generation-- the student will be able to:

- 03.01 Explain the conventional electric power generation systems and process (coal, gas, hydroelectric, and nuclear).
- 03.02 Identify electric power generation equipment and systems.
- 03.03 Identify various conventional electric power generation fuel sources and the cost/ efficiency/environmental issues associated with each:
 - a. Explain how oil was created and list its advantages and disadvantages.
 - b. Explain how coal was created and what are its advantages and disadvantages.
 - c. Explain how natural gas was created and what are its advantages and disadvantages.
 - d. Explain how water is used in hydroelectric power generation and what are its advantages and disadvantages.
 - e. Explain how uranium is created and what are its advantages and disadvantages.
- 03.04 Discuss emerging and alternative electric power generation technologies and fuel sources.
- 03.05 Explain how solar energy is used to produce electricity in photovoltaic systems and what are its advantages and disadvantages.
- 03.06 Explain how solar energy is used to produce electric energy using steam and what are its advantages and disadvantages.
- 03.07 Explain how wind energy is used to produce electric energy and what are its advantages and disadvantages.
- 03.08 Explain how geothermal energy is used to produce electric energy and what are its advantages and disadvantages.
- 03.09 Explain how biomass energy is used to produce electric energy and what are its advantages and disadvantages.
- 03.10 Explain how ocean wave energy is used to produce electric energy and what are its advantages and disadvantages.
- 03.11 Discuss pros and cons of various energy producing technologies and fuels in the electrical infrastructure (including fossil, nuclear and emerging alternative energy systems).

04.0 Understand electric power transmission-- the student will be able to:

- 04.01 Explain the electric power transmission process.
 - 04.02 Discuss the application of different electric power transmission principles (including AC vs. DC).
 - 04.03 Name electric power transmission equipment and systems.
 - 04.04 Discuss the emerging technologies in electric power transmission (including Smart Grid).
 - 04.05 Explain ownership/governance of the electric transmission system.
- 05.0 Understand electric power and natural gas distribution-- the student will be able to:
- 05.01 Explain the electric power distribution process.
 - 05.02 Discuss the need for electric distribution systems and how they are designed to operate.
 - 05.03 Name electric power distribution system equipment and-what the various components do.
 - 05.04 Discuss the emerging technologies in electric power distribution, including distribution automation and SmartGrid systems.
 - 05.05 Explain the fundamental concepts of natural gas.
 - 05.06 Identify the components and workings of the gas transmission and distribution network, including metering and regulating stations.
- 06.0 Identify and describe careers and entry requirements-- the student will be able to:
- 06.01 Describe entry-level careers available in energy generation, transmission, distribution and the education/experience requirements for entry into those positions, along with career development and advancement opportunities from those positions.
 - 06.02 Identify entry-level careers available in business and corporate support functions of the energy industry; describes the education/experience requirements for entry into those positions, and career advancement opportunities from those positions.
 - 06.03 Describe general wage/salary, benefits, and other advantages of careers in the energy industry.
 - 06.04 Explain the educational pathways available to gain training necessary for entry into energy careers at secondary and post-secondary levels (Partner to create Energy Education Portal).
- 07.0 Evaluate and analyze energy 'hot topics'-- the student will be able to:
- 07.01 Energy "Hot Topics"
 - 07.02 Describe energy efficiency/conservation
 - 07.03 Describe alternative energy (wind, solar, biomass, geothermal)
 - 07.04 Describe emerging technologies (wave, algae, IGCC, clean coal, etc.)
 - 07.05 Describe SmartGrid and Time of Use technologies
 - 07.06 Describe key energy regulatory topics (cap and trade, etc.) efficiency, cost, etc.).

BLDE 100: Energy Industry Fundamentals

Goals, Topics, and Objectives

Core Course Topics

Upon successful completion of this program, students should be able to (* indicates critical thinking objectives):

1. History and Organization of the U.S. Energy Industry

- Define the structure and organization of the Energy Industry.
 - I. Energy Industry Fundamentals Module 1
 - a. Presentation/Notes, Text/Worksheet, Activities, and Quiz
 - II. Introduction to Electricity
 - a. Circuits – Series, Parallel, and Complex
 - b. Values – Resistance, Current, Voltage, and Power
 - c. Calculations – Ohm’s, Watt’s, and Kirchhoff’s Law
 - i. Presentation, Labs, Guided Practice, and Worksheets

2. Safety in the Energy Industry

- Identify safety practices in the Energy Industry.
 - I. Energy Industry Fundamentals Module 2
 - a. Presentation/Notes, Text/Worksheet, Activities, and Quiz
 - II. OSHA 10 Training – CareerSafe
 - a. Video Presentations, Interactive Training and Review Quizzes
 - III. Hand & Power Tool Safety and Ladder Training
 - a. Demonstrations, Handout, Guided Practice, and Quiz

3. Electric Power Generation

- Identify electric power generation systems.

- I. Energy Industry Fundamentals Module 3
 - a. Presentation/Notes, Text/Worksheet, Activities, and Quiz
 - II. Vernier – simpleGen Electric Generator Activity/Lab
 - III. Amatrol – Alternative Energy Trainer Lab
4. Electric Power Transmission and Distribution
- Differentiate between hydro, solar, wind, biofuel and geothermal energy.*
 - I. Energy Industry Fundamentals Module 4 and 5
 - a. Presentation/Notes, Text/Worksheet, Activities, and Quiz
 - II. Recharge Labs – Power Grid Activity/Lab
 - III. Hampden – Transformer Trainer Lab
5. Energy Industry Fundamentals Careers
- Differentiate between the various areas of employment and employment qualifications defined by the energy industry.
 - I. Energy Industry Fundamentals Module 6
 - a. Presentation/Notes, Text/Worksheet, Activities, and Quiz
 - II. CEWD – Employability Skills
 - a. Presentation/Notes, Text/Worksheet, Activities, and Quiz
 - III. Career Tree/Career Cruising Research Assignment
 - IV. Resume Writing Assignment
6. Applied Math
- Demonstrate applied math skills (ratios and proportions, fractions, decimals, measurement, etc.)*
 - I. Electrical Wiring Projects 1-15
 - a. Construction Math
 - i. Linear Measurements – Adding/Subtracting Whole Numbers, Fractions, and Decimals

- ii. Calculating Loads/Purchasing Material – Add, Subtract, Multiply, Divide, Percentages, Diameter, and Referencing Charts
- iii. Bending Conduit – Measurement, Angles, and Trigonometry

II. Electricity Worksheets and Labs

a. Circuit Calculations

- i. Metric Prefix Conversions
- ii. Solving Formulas – Add, Subtract, Multiply, Divide, Decimals, Fractions, and Reciprocals